CLAIMS

What is claimed is:

1. A fire-resistant structural composite material comprising:

a phenolic resin system,

reinforcing fibers, and

alumina tri-hydrate;

whereby the composite material has an ASTM E-1354 Ignitability of greater than about 60 seconds, an ASTM E-1354 300-Second Average Heat Release of less than about 120 kW/m^2, and an ASTM E-1354 Peak Heat Release of less than about 150 kW/m^2 when the composite is exposed to a radiant heat source of about $100kW/m^2$; and

wherein the composite material is suitable for forming into a structural part.

2. The composite material of claim 1, wherein the phenolic resin system is acid-catalyzed.

3. The composite material of claim 1, wherein the phenolic resin system is base-catalyzed.

4. The composite material of claim 1, wherein the phenolic resin system comprises about 17% to about 21% by weight of the composite material, based on the total weight of the composite material.

5. The composite material of claim 1, wherein the reinforcing fibers are selected from group consisting of glass fiber, carbon fibers, and mixtures and combinations thereof.

6. The composite material of claim 1, whereby the composite material comprises about 63% to about 77% by weight reinforcing fibers, based on the total weight of the composite.

7. The composite material of claim 1, whereby the composite material comprises about 7% to about 12% by weight alumina tri-hydrate, based on the total weight of the composite material.

8. The composite material of claim 2, whereby the composite material comprises about 7% -9% by weight alumina tri-hydrate, based on the total weight of the composite material.

9. The composite material of claim 3, whereby the composite material comprises about 12% by weight alumina tri-hydrate, based on the total weight of the composite material.

10. The composite material of claim 1, wherein the phenolic resin system additionally comprises a siloxane modifier.

11. The composite material of claim 1, whereby the composite material is formed by a method selected from the group consisting of: resin transfer molding resin infusion, filament winding, pultrusion and vacuum assisted resin transfer molding.

12. The composite material of claim 1, wherein the composite material is suitable for forming into a structural part without requiring additional structural materials.

13. The composite material of claim 1, wherein the composite material has an ISO 9705 Average Heat Release Rate of less than about 100 kW, and an ISO 9705 Smoke Production Rate of less than about 1.4 m2/second.

14. The composite material of claim 1, wherein the composite material has an ASTM E-1354 Ignitability of greater than about 90 seconds, an ASTM E-1354 300-Second Average Heat Release of less than about 100 kW/m2, and an ASTM E-1354 Peak Heat Release of less than about 100 kW/m2 when the composite is exposed to a radiant heat source of about 75 kW/m2.

15. The composite material of claim 1, wherein the composite material has an ASTM E-1354 Ignitability of greater than about 150 seconds, an ASTM E-1354 300-Second Average Heat Release of less than about 50 kW/m2, and an ASTM E-1354 Peak Heat Release of less than about 65 kW/m2 when the composite is exposed to a radiant heat source of about 50 kW/m2.

16. A structural part formed from a fire-resistant composite material comprising:

a phenolic resin system,

reinforcing fibers, and

alumina tri-hydrate;

whereby the composite material has an ASTM E-1354 Ignitability of greater than about 60 seconds, an ASTM E-1354 300-Second Average Heat Release of less than about 120 kW/m^2, and an ASTM E-1354 Peak Heat Release of less than about 150 kW/m^2 when the composite is exposed to a radiant heat source of about 100kW/m^2.

17. The structural part of claim 16, wherein the phenolic resin system is acid-catalyzed.

18. The structural part of claim 16, wherein the phenolic resin system is base-catalyzed.

19. The structural part of claim 16, wherein the phenolic resin system comprises about 17% to about 21% by weight of the composite material, based on the total weight of the composite material.

20. The structural part of claim 16, wherein the reinforcing fibers are selected from group consisting of glass fiber, carbon fibers, and mixtures and combinations thereof.

21. The structural part of claim 16, whereby the composite material comprises about 63% to about 77% by weight reinforcing fibers, based on the total weight of the composite.

22. The structural part of claim 16, whereby the composite material comprises about 7% to about 12% by weight alumina tri-hydrate, based on the total weight of the composite material.

23. The structural part of claim 17, whereby the composite material comprises about 7% -9% by weight alumina tri-hydrate, based on the total weight of the composite material.

24. The structural part of claim 18, whereby the composite material comprises about 12% by weight alumina tri-hydrate, based on the total weight of the composite material.

25. The structural part of claim 16, wherein the phenolic resin system additionally comprises a siloxane modifier.

26. The structural part of claim 16, whereby the composite material is formed by a method selected from the group consisting of: resin transfer molding resin infusion, filament winding, pultrusion and vacuum assisted resin transfer molding.

27. The structural part of claim 16, wherein the composite material is suitable for forming into a structural part without requiring additional structural materials.

28. The structural part of claim 27, wherein the composite material forms the entire load bearing path of the structural part.

29. The structural part of claim 16, wherein the composite material has an ISO 9705 Average Heat Release Rate of less than about 100 kW, and an ISO 9705 Smoke Production Rate of less than about 1.4 m2/second.

30. The structural part of claim 16, wherein the composite material has an ASTM E-1354 Ignitability of greater than about 90 seconds, an ASTM E-1354 300-Second Average Heat Release of less than about 100 kW/m2, and an ASTM E-1354 Peak Heat Release of less than about 100 kW/m2 when the composite is exposed to a radiant heat source of about 75 kW/m2.

31. The structural part of claim 16, wherein the composite material has an ASTM E-1354 Ignitability of greater than about 150 seconds, an ASTM E-1354 300-Second Average Heat Release of less than about 50 kW/m2, and an ASTM E-1354 Peak Heat Release of less than about 65 kW/m2 when the composite is exposed to a radiant heat source of about 50 kW/m2.

32. The structural part of claim 16, wherein the structural part is used in all or a portion of a primary load-bearing structure.

33. The structural part of claim 32, wherein the primary load-bearing structure is a foundation, a frame, or a structural girder.

34. The structural part of claim 16, wherein the structural part is used in all or a portion of a secondary load-bearing structure.

35. The structural part of claim 34, wherein the secondary load-bearing structure is a deck grating, an elevator platform, a floor panel, a guide rail or a storage rail.

36. The structural part of claim 16, wherein the structural part is used in all or a portion of a motor component structure.

37. The structural part of claim 36, wherein the motor component structure is a motor housing or a motor shaft.

38. The structural part of clam 16, wherein the structural part is used in all or a portion of a fire enclosure structure.

39. The structural part of claim 16, wherein the structural part is used in a marine structure.

40. The structural part of claim 16, wherein the structural part is used in an aircraft structure.

41. The structural part of claim 16, wherein the structural part is used in a ground vehicle structure.

42. The structural part of claim 16, wherein the structural part is used in a construction structure.